Predicting adverse outcomes in older medical emergency department patients

Impact paragraph

Scientific and social impact of this thesis

In this chapter, the relevance of the results described in this thesis and their scientific and social impact will be discussed.

Scientific impact of the thesis

This thesis has added value to clinical research as it provides insights in the characteristics of the older medical emergency department (ED) population, their risks of adverse outcomes and it offers new tools to identify older patients with high risks of adverse outcomes. In addition, it provides information regarding the concerns of older patients (or their caregivers) during an ED visit.

Tools to predict short-term adverse outcomes

This thesis shows that different tools, which can easily be applied during ED stay, are good predictors of adverse outcomes in older patients. This main finding has impact on ED research in several ways.

First, several questions which are depicted in five point scores, quantify clinical intuition parameters and are applicable to predict short-term mortality. This approach may be helpful in future studies regarding clinical intuition.

Secondly, the five biomarkers lactate, high-sensitivity cardiac troponin T (hs-cTnT), N-terminal pro-B-type natriuretic peptide (NT-proBNP), D-dimer and procalcitonin (PCT) are good predictors of short-term outcomes. Nevertheless, there is a large overlap in survivors and non-survivors making these biomarkers less ideal as a single predictor of mortality. Moreover, they are expensive and have limited added value to the RISE UP score. Therefore, these biomarkers should not be used solely as predictors of adverse outcome in future research. Our advice is that these parameters must be applied in clinical research as prognostic markers only on strict indication.

Thirdly, the RIsk Stratification in the Emergency department in acUtely Ill older Patients (RISE UP) score can predict short-term mortality accurately in older ED patients and outperforms established risk-stratification scores. Additionally, we showed that this score is also suitable for prediction of adverse outcomes in patients with COVID-19, which may be extremely valuable in decision making in the ED in the

current pandemic and for all clinical research regarding this new infectious disease. This score has the advantage of using objective and inexpensive variables, which are part of routine work-up in the ED, making the RISE UP score a valuable tool for prediction of short-term mortality in future (ED) studies.

All parameters investigated in the RISE UP study represent disease severity, reflecting both the pre-morbid state and acute medical problems for which the patient contacts the ED. This implies that for prediction of short-term outcomes, and especially mortality, tools that represent disease severity can be used instead of geriatric variables (e.g. cognitive or physical function). This has a major impact on clinical research, since, in most ED studies regarding older patients, it remains difficult to accurately assess important geriatric aspects. The tools investigated in this thesis can therefore be used in future studies as predictors of mortality and as a reflection of disease severity, with the RISE UP score being the preferred tool.

Concerns of older patients and caregivers

This thesis has impact on qualitative research regarding concerns and care needs of older ED patients, as it provides insight in the different kinds of concerns older patients have. This knowledge can be used in future studies regarding the quality of ED care and can focus in further exploring the different kinds of concerns and care needs of older ED patients.

Prediction of major adverse cardiovascular events

The finding that older patients visiting the ED with non-specific complaints are at very high risk of developing MACE within 1 year after their ED visit has impact on cardiovascular research. Especially NT-proBNP can be used as a predictor of MACE in addition to classical cardiovascular risk factors. It would be very interesting for future research to focus on preventive interventions, e.g. preventive medications, echocardiography or close monitoring of high risk patients by cardiologists in order to reduce their risk of MACE.

Social impact of the thesis

Relevance for health care professionals, patients and caregivers

The research findings described in this thesis are important for daily practice for health care providers since it provides insight into the risk factors of adverse outcomes in older ED patients. The finding that several parameters concerning disease severity are highly important for the prediction of short-term outcome is important for clinicians working inside as well as outside the hospital (e.g. primary care or nursing homes) because this may be very helpful in clinical decision making. The RISE UP score can be a valuable tool in the ED for health care professionals as well as for patients and caregivers since the score gives an accurate prediction of short-term mortality. Prognosis will most likely play an important role in clinical decision making since clinicians can place a prognosis in the whole context of the individual patient, making care more personalised. Furthermore, this prognosis can be used in a conversation with patients and caregivers and may guide shared-decision making. In patients with high risk of mortality this can result in the decision to intensify medical care or, adversely, in the decision to refrain from further diagnostics or treatments and choose for supportive care. On the other hand, in patients with low risk of mortality, this prognosis can result in the decision to safely treat at home or discharge the patient in an early stage. Prediction by the RISE UP score may have impact on ED and hospital care regarding outcomes or wellbeing of older patients and reduction of costs for clinical healthcare.

This thesis also provided more information about the specific concerns of older ED patients, which is valuable to health care providers, patients and caregivers. Based on the findings provided in this thesis, it is recommended that at the ED, more attention should be paid to the concerns of the patients and their caregivers. By doing so, we will be able to find out what matters to these patients and find ways to reduce their concerns and adjust care to their needs and preferences, which will subsequently improve ED care.

Relevance for society

Prediction of mortality or other adverse clinical outcomes in older patients visiting the ED is extremely important for clinical decision making and saving of costs for health care. Moreover, in the current COVID-19 pandemic, resources turn out to be even more scarce and difficult decisions have to be made concerning treatment and allocation of medical care. For example, prediction of a low risk of mortality may

result in a safe decision to treat patients at home (or at a corona hotel), or may result in a shorter hospital stay, while for high risk patients, it can result in the decision to transfer to the ICU at an early stage or in the decision or choice for supportive care.

Implementation in daily practice

The results of this thesis can and will be shared with others in several ways. First, by publishing the results of the studies in medical journals, healthcare providers can be informed. Secondly, we intend to publish our results on a website of Maastricht University Medical Centre+ so these will be easily accessible for other healthcare providers, patients and caregivers. Third, the RISE UP score can be implemented in routine care by development of an online calculator (which is already available) and/or by incorporating the score into an electronical medical record system. Fourth, other hospitals can and will be informed of the results of this thesis by presenting the results at scientific meetings, congresses or webinars also with the aim of collaboration in future research and medical care.